Critical Thinking Questions Chapter 4

1.)

a) Display Great job! when the grade is 90 or higher.

```java
System.out.print("please enter your mark.");

            int Mark = userInput.nextInt();




            if (Mark >= 90) {

                    System.out.print("Great job!");

            }
```

b) Display Error when number is less than 20 or greater than 50

```java
System.out.print("please enter your number.");
        int NUM = userInput.nextInt();

        if (NUM < 20 ) {
                System.out.print("Error");
        }
        if (NUM > 50) {
                System.out.print("Error");
        }
```

c) Add 2 to the y value when y is less than 100.

```java
System.out.print("please enter your number.");
        int Y = userInput.nextInt();

    if (Y<100) {
            Y+=2;
            System.out.print(Y);
                }
```

2.)

Assume num1 and num2 contain integer values. Write an if-else if statement that displays one of the following messages as appropriate: First number is larger. Second number is larger. Numbers are equal.

```java
Scanner userInput = new Scanner(System.in);

            System.out.print("please enter your number 1.");
            int number1 = userInput.nextInt();

            System.out.print("please enter your number 2.");
            int number2 = userInput.nextInt();

            if (number1 > number2) {
               System.out.println("number1 is larger.");
            } else if (number2 > number1) {
               System.out.println("number2 is larger.");
            } else {
               System.out.println("both number1 and number2  are equal.");
            }
```

3.)

a) Which is the appropriate word, odd or even for the blanks below?

```java
if (num % 2 == 0) {
System.out.println(" even  number");
} else {
System.out.println(" odd  number");
}
```

b) Rewrite the if-else as a switch statement

```java
Scanner userInput = new Scanner(System.in);

            System.out.println("please enter your number.");
            int number = userInput.nextInt();

            switch (number % 2) {
            case 0: System.out.println("even number");
            break;

            case 1: System.out.println("odd number");
            break;
            }
```

4.)

The nextInt() method in the Random class generates a random integer between 0 and a specified maximum value. Write a formula that includes the nextInt() method for each of the following situations:

a) Generate a random integer between 1 and 50.

int random = new Random().nextInt(50) + 1;

b) Generate a random integer between 20 and 100.

int random = new Random().nextInt(80) + 20;

c) Generate a random double between 10 and 20.

double random = new Random().nextDouble (10) + 10;

5.) Identify the logic errors in the statements below, which should display a single appropriate message for any value of age:

The program didn't account for the ages of 18 and 65.
Fix:

If age is <18, child.
 If age is greater than/equal to 18 and also less than 65, Adult.
Else is Senior.

```
int AGE;

System.out.println("Please enter your age:");
 AGE = userInput.nextInt();

 if (AGE < 18) {
        System.out.println("Child");

    } else {
         if (AGE >= 18) {

             if (AGE < 65) {
                 System.out.println("Adult");

             } else {
                 System.out.println("Senior");
             }
```

6.)

a) size > 50 && weight == 50 **True**

b) value < 100 && !(weight == 50) **False**

c) size >= 100 || value >= 100 **True**

d) weight < 50 || size > 50 **True**

e) !(value < 75) **True**

f) !(size > 100 && weight >50 && value > 75) **True**

g) (value < 125 || weight < 76) && size ==100 **True**

8.)

Determine if each of the following are true or false. If false, explain why.

a) The condition of an if statement must be a Boolean expression. **True**

b) A nested if statement and an if-else if statement are the same. **False**

c) The expression in a switch statement must evaluate to a double. **False**

d) Numbers generated by a computer program are actually pseudorandom. **True**

e) The (double) cast is needed to generate a random integer **False**

f) A compound Boolean expression can contain more than two Boolean expressions. **True**

g) In a logical And expression, both operands must be true for the expression to evaluate to true. **True**

 h) In logical expressions, && is evaluated before !. **False**

i) The pow() method in the Math class is used for exponentiation. **True**

j) The statement x = abs (-3); will return the value 3. **False**